

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:	TERMIN: 3 Apr 2005
PNK	see form PCT/ISA/220
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WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY  
(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220 CH3.2003.0021

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/B2004/001379

International filing date (day/month/year)  
28.04.2004

Priority date (day/month/year)  
03.06.2003

International Patent Classification (IPC) or both national classification and IPC  
H01L51/40

Applicant  
INTERNATIONAL BUSINESS MACHINES CORPORATION

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1b(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

10/559397  
IAP16 RES'D PCT/INTO 05 DEC 2005  
International application No.  
PCT/IB2004/001379

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**Box No. I Basis of the opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/IB2004/001379

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**Box No. II Priority**

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1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	6,9,11,13-15
	No: Claims	1-5,7,8,10,12
Inventive step (IS)	Yes: Claims	
	No: Claims	1-15
Industrial applicability (IA)	Yes: Claims	1-15
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE  
 INTERNATIONAL SEARCHING  
 AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/IB2004/001379

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**Re Item V.**

1. The following documents are referred to in this communication:

D1 : EP 1 223 201 A (CAREY BROTHERS LTD) 17 July 2002

D2 : Katherine Derbyshire, "Are plastics the future of electronics",  
 SEMICONDUCTOR MAGAZINE, [Online] vol. 3, no. 4, 1 April 2002,  
 Retrieved from the Internet:  
 URL: <http://dom.semi.org/web/wmagazine.nsf/0/f65c6d097aeea4be88256b8e0076e255?OpenDocument>

D3 : US 2002/083858 A1 (OKUZAKI HIDENORI ET AL) 4 July 2002

D4 : US-A-6 071 333 (BRETON MARCEL P ET AL) 6 June 2000

D5: "Hot melt ink technology for crystalline silicon solar cells", Todd Williams,  
 preprint of poster to be presented at 29th IEEE PVSC New Orleans 20-24th  
 March 2002, document retrieved from the Internet: URL:  
<http://www.bpsolar.com/ContentDocuments%5C154%5CACF16E2.pdf>

2.

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-5, 7, 8, 10 and 12 is not new in the sense of Article 33(2) PCT.

2.1

Document D1 discloses (the references in parenthesis applying to this document):

A method for forming a pattern on a surface by deposition of a mixture that comprises an application material (ceramics particles) and a phase change transfer material (wax), the method comprising the steps of:

- heating the mixture to a melt (paragraph 31)
- depositing the melted mixture on the surface with a phase change printing technique, thereby the melted mixture solidifies instantaneously when it reaches the surface (paragraph 31) and
- removing the transfer material (paragraph 31)

Moreover, the application material, ceramic particles, and the wax are mixed together (paragraph 57), the transfer material is removed by sublimation (paragraph 64), by heating the deposited mixture, and multiples layers can be deposited following this process (paragraph 51).

The composition for patterning a surface comprises the application material (ceramic powder) and a phase-change transfer material (solid at 0°C and melting point below 200°C at ambient pressure, see table 1, paragraph 31) that sublimates after patterning by an action (paragraphs 31 and 51, lines 22-25). Different materials can be added to the

transfer material (paragraph 50).

Document D1 discloses all features of claims 1-5,7,8,10 and 12. Consequently, the subject-matter of these claims is not new in the sense of Article 33(2) PCT.

3.

The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claims 6, 9, 11 and 13-15 does not involve an inventive step in the sense of Article 33(3)PCT.

3.1

Document D2, which is considered to be an other relevant prior art, discloses (the references in parenthesis applying to this document):

✓ A method for fabricating an OLED device and particularly a method to deposit organic materials by solid ink printing technology (page 3, manufacturing organic electronics), which is an other name to the phase-change printing technique or the hot-melt ink printing technology.

This technique is a method known in the prior art to deposit patterned layers (see documents D1 or D5 and discussion in previous paragraph) and comprises the step of:

- heating a composition to a melt, the composition comprising phase-change transfer material and application material (which is in the case of OLED, an organic material, see D2)
- depositing the melted composition onto a surface by phase-change printing, the melted composition solidifies instantaneously when it reaches the surface
- removing the transfer material

Consequently, it is obvious for a skilled person who wants to produce an OLED using solid ink printing technique as proposed in D2 to use the standard process steps as described in D1 or D5.

Therefore, the subject-matter of claim 6 does not involve an inventive step in the sense of Article 33(3) PCT.

The same reasoning can be applied to the subject-matter of claims 9 and 13, which also appears to lack an inventive step.

3.2

Document D3, which is an other relevant prior art discloses a method to manufacture a field effect transistor in which the electrically active material, the source, the drain or the connection between the source and the drain, i.e the active layer, can be deposited by either electrophotographic printing or solid ink printing (paragraph 153, paragraph 174-

182, claims 57, 62, 83, 104, 105, 106, 107).

Therefore, for the same reasons mentioned in previous paragraph, it would be obvious for a skilled person to use the general knowledge on the solid ink printing technology as described in D1 or D5 to manufacture the field effect transistor as described in D3, thereby arriving at the subject-matter of claim 14. Consequently, the subject-matter of this claim appears to lack an inventive step.

Moreover, as document D3 also proposes to deposit the drain or the source by this technique, it would be obvious for a skilled person to deposit different layers of the field effect transistor using the same technique to reduce manufacturing costs. Consequently, the subject-matter of claim 15 does not involve an inventive step.

### 3.3

The subject-matter of claim 11 differs from D1 in that the transfer material comprises cyclododecane or its derivatives. However, this compound is known in the prior art as one of the constituent of a phase-change ink for a phase-change ink jet system (see for instance document D4, column 9, lines 34 and 43).

Therefore, this feature is merely one of the several possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill.

Therefore, the subject-matter of this claim does not involve an inventive step.